

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen
(D) [] No distribution

D E C I S I O N
of 9 July 2002

Case Number: T 1160/98 - 3.4.1

Application Number: 90111371.2

Publication Number: 0403983

IPC: G07D 7/00

Language of the proceedings: EN

Title of invention:

Method and apparatus for validating a paper-like piece

Patentee:

NIPPON CONLUX CO., LTD

Opponent:

GIESECKE & DEVRIENT GmbH

Headword:

-

Relevant legal provisions:

EPC Art. 56

Keyword:

"Inventive step - no (main request and auxiliary request)"

Decisions cited:

-

Catchword:

-



Case Number: T 1160/98 - 3.4.1

D E C I S I O N
of the Technical Board of Appeal 3.4.1
of 9 July 2002

Appellant: NIPPON CONLUX CO., LTD
(Proprietor of the patent) 2-2, Uchisaiwai-Cho 2-chome
Chiyoda-ku
Tokyo-To (JP)

Representative: Selting, Günther, Dipl.-Ing.
Patentanwälte
von Kreisler, Selting, Werner
Postfach 10 22 41
D-50462 Köln (DE)

Respondent: GIESECKE & DEVRIENT GmbH
(Opponent) Prinzregentenstrasse 159
D-81677 München (DE)

Representative: Klunker, Hans-Friedrich, Dr.
Patentanwälte
Klunker . Schmitt-Nilson . Hirsch
Winzererstrasse 106
D-80797 München (DE)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 15 October 1998
rejecting the opposition against European patent
No. 0 403 983 pursuant to Article 102(2) EPC.

Composition of the Board:

Chairman: G. Davies
Members: M. G. L. Rognoni
G. Assi

Summary of Facts and Submissions

I. The appellant (opponent) lodged an appeal, received on 9 December 1998, against the decision of the opposition division, despatched on 15 October 1998, rejecting the opposition against the European patent No. 0 403 983. The fee for the appeal was paid on 9 December 1998 and the statement setting out the grounds of appeal was received on 17 February 1999.

II. The opposition had been filed against the patent as a whole based on Article 100(a) EPC and concerned, in particular, objections under Articles 52(1) and 56 EPC.

III. In the decision under appeal, the opposition division held, *inter alia*, that the subject-matter of independent claims 1 and 6 of the patent as granted involved an inventive step, having regard, in particular, to the following prior art documents:

E1: DE-A-34 17 218

E2 DE-A-35 27 301.

IV. With the statement of grounds of appeal, the appellant submitted the following document:

E4: DE-A-23 10 882.

V. Oral proceedings were held on 9 July 2002.

VI. The appellant requested that the decision under appeal be set aside and the patent be revoked.

Furthermore, the appellant requested that document E4

be admitted into the proceedings.

- VII. The respondent (patentee) requested that the appeal be dismissed and the patent be maintained as granted (**main request**); or that the patent be maintained on the basis of claims 1 to 6 filed on 29 June 1999 (**auxiliary request**).

Furthermore, the respondent requested that the late-filed document E4 be disregarded.

- VIII. The wording of claim 1 according to the **main request** reads as follows:

"1. An apparatus for validating an object comprising:

detection means (1; 12, 13) for producing a detection signal corresponding to a pattern on a deposited object by irradiating light on the object,

reference level data providing means (2; 21, 30) for preparing reference level data (T10P),

standard pattern providing means (3; 21, 29) for providing a predetermined standard pattern corresponding to a pattern of a true object,

determination means (5; 21) for determining whether the object to be validated is true or false,

characterised

by data-to-be-examined providing means (4; 21, 23) for providing data to be examined which is obtained by

converting a detection signal (T10A) produced by said detection means (1; 12, 13) in response to deposition of a paper-like piece to be validated to a ratio to or deviation from the reference level data (T10P) provided by said reference level data providing means (2; 21, 30), and in that

the determination means (5; 21) collates the data to be examined provided by said data-to-be-examined providing means (4; 21, 23) with the standard pattern provided by said standard pattern providing means (3; 21, 29), and

the reference level data (T10P) is based on a detection signal produced by said detection means in response to deposition of a reference paper-like piece on which no particular pattern is provided."

Claims 2 to 5 are directly or indirectly dependent on claim 1.

Independent claim 6 relates to a method comprising steps corresponding to the subject-matter of claim 1.

Claims 7 and 8 are dependent on claim 6.

The wording of claim 1 according to the **auxiliary request** differs from claim 1 of the main request in that:

- the detection means (1; 12, 13) is specified as "including a sensor system of light transmission type",

and in that

- " said standard pattern providing means (3; 21, 29) provides the standard pattern corresponding to the pattern on the normal paper-like piece as a ratio or deviation to the reference level data".

Claims 2 to 4 are directly or indirectly dependent on claim 1.

Independent claim 5 relates to a method corresponding to the subject-matter of claim 1.

Claim 6 is dependent on claim 5.

IX. The appellant's submissions may be summarized as follows:

Though document E4 was not concerned with the detection of a particular pattern, it was submitted to prove that it was known to remove a constant signal level from a variable signal indicative of certain features (*ie* soil marks) present on the surface of a bill. Since it disclosed an essential aspect of the contested patent, E4 should be admitted into the proceedings.

Document E1 related to an apparatus for validating an object and dealt with the problem of compensating for possible errors in the optical detection system. The essential difference between the subject-matter of claim 1 according to the **main request** and the validator shown in E1 was that in the former the reference signal was generated using a paper-like bill without any pattern, whereas the latter taught to generate a reference level by operating the validator without any

document. The only effect that the paper-like bill was supposed to achieve was to bring the reference level close to the range of amplitudes of the signal produced by the pattern to be detected.

E2 related to a scanning apparatus and was, in particular, concerned with the problem of compensating for defects in the response of an optical system which ideally should have a constant linear response in the sense that the same pattern should produce the same output in different apparatuses or in the same apparatus after a certain time of use. E2 achieved this compensation by detecting the response of the optical system to a "normal white plate". As the detectors of the scanning apparatus of E2 were supposed to operate in a certain linear range, the purpose of the white plate was also to reflect a light in the same range as the signals produced by the objects to be scanned. From the point of view of the underlying technical teaching, there was no difference between the white plate referred to in E2 and the paper-like bill with no particular pattern of the contested patent.

Since the validator according to claim 1 of the main request resulted from an obvious application of the teaching of E2 to the validator known from E1, the subject-matter of this claim did not involve an inventive step (Article 56 EPC).

Claim 1 according to the **auxiliary request** differed from the claim 1 according to the main request in that it specified that the detection of the pattern was in the transmission mode and that also the standard pattern was normalised with respect to a reference level. As to the first difference, it was implicit for

the person skilled in the art that this referred to one of the two possible ways of detecting a pattern on the surface of a document. As to the second difference, it was clear that the problem of reducing the level of light picked up by the sensor was particularly important when the light source was located opposite the sensor, so that its light did not undergo any reflection and attenuation before reaching the sensor.

Hence, also the subject-matter of claim 1 according to the auxiliary request did not involve an inventive step within the meaning of Article 56 EPC.

X. The respondent argued essentially as follows:

E4 was submitted by the appellant after the opposition period and therefore its admission into the proceedings at this late stage could be justified only by its evident relevance. Since this document did not relate to an apparatus for validating documents and did not teach to detect a predetermined pattern, it was not relevant to the present case.

The present invention, as specified in claim 1 according to the **main request** related to a validator which took into account errors present in individual parts of an optical sensor or in assembling those parts. The data to be examined to establish the validity of a document was expressed as a ratio to a reference level based on a detection signal produced in response to the deposition of a reference paper- like piece on which no particular pattern was provided. Thus, the reference level used for normalising the measured data was not influenced by any saturation effect of the sensor, but it was set at the level of

the reference paper-like piece.

Document E1 discloses a document validator which used as correction factor for the data to be examined a ratio between reference levels obtained when the apparatus was operated without any document. Direct illumination of the sensor caused the sensor to operate in saturation, ie in a state in which the effect of parts and assembly errors of the detecting means on the sensor output was relatively small. Hence, the reference level generated in this state was not suitable for compensating for such errors.

E2 did not relate to a document validator but disclosed an apparatus for scanning and storing images. The detecting means comprised an array of light sensors for scanning an object. E2 taught to use the signal produced by scanning a standard white plate of uniform reflectivity to compensate for differences in the response of the sensor elements or in the irradiation of the sensor provided by a longitudinal light source parallel to the sensor array.

Since E2 related to the correction of the sensitivity of an array of light sensors, the skilled person would have no reason to apply its teaching to the validator known from E1. Hence, the subject-matter of claim 1 of the **main request** involved an inventive step.

Claim 1 according to the first auxiliary request was limited to a validator comprising detecting means which worked in the transmission mode, ie the light source and the sensor were disposed on opposite sides with respect to the document to be validated. In E1, however, the pattern detection was effected in the

reflection mode. The problem of attenuating the light reaching the sensor when no document was present in the scanning area was particularly acute when a validator worked in the transmission mode. Since none of the prior art documents related to the problem of generating a reference level for a validator working in the transmission mode, it could not have been obvious to arrive at the subject-matter of claim 1 of the auxiliary request.

Reason for the Decision

1. The appeal is admissible.

Admissibility of E4

- 2.1 Document E4 deals with the problem of determining the degree of dirtiness of banknotes and teaches essentially to derive a parameter indicative of such dirtiness from the output of a sensor responsive to the light reflected by the blank margins of a banknote. According to the appellant, this document should be regarded as relevant to the present case because it taught to subtract a constant level representing the average reflectivity of the paper from a variable signal produced by the varying reflectivity of a banknote's soiled surface. However, as pointed out by the respondent, E4 is not concerned with the detection of a predetermined pattern for the purpose of validating a certain document, or with the determination of a reference level for the normalisation of the signal produced by such pattern.

2.2 Considering that E4 was filed after the opposition period had expired and that its content cannot be considered as highly relevant to the present case, the Board decides to exercise the discretion provided by Article 114(2) EPC and to refuse the admission of E4 into the proceedings.

Main request

3.1 The present invention relates to an apparatus for validating a "paper-like piece" having "a face value or identifying function" such as a bill or banknote. The validation of a bill is generally based on the comparison between the response of an optical sensor to a certain pattern and the predetermined response to the pattern of a "true bill".

3.2 The contested patent essentially proposes to **normalize** both the response to the pattern on a bill to be examined and the predetermined response, before the comparison between the responses is performed, and to take as reference level for the normalization the validator's response to a "reference paper-like bill" with no particular pattern. In other words, the reference level taken for the normalisation is essentially the optical sensor's response to a surface comparable to the "background" of the pattern to be detected.

4. The novelty of claims 1 of the patent as granted has not been disputed by the appellant. Hence, novelty is not at issue in the present case.

5.1 The parties agree that E1, which relates to a validator comprising all the features recited in the preamble of

claim 1 of the patent in suit, represents the closest prior art.

In order to compensate for variations in the intensity of the light source and in the sensitivity of the sensor, E1 foresees the use of a "correction factor" which is defined as the ratio between the sensor's "correct" response to a "normal light intensity" and the actual response to the actual light intensity, whereby both responses are obtained when the validator is operated without any document.

Since the predetermined response to a pattern is compared with the actual response to the pattern on a bill multiplied by the correction factor (cf. E1, page 19, lines 6 to 12), both responses are effectively defined as "deviations" from the "correct" response to the same "normal" light source. In other words, the comparison is effected between responses which are "normalized" with respect to the same reference level.

Hence, the validator according to E1 comprises also the first two features specified in the characterising part of claim 1 in the sense that the data to be examined are obtained by converting a detection signal (*ie* the output of a sensor) produced by the detection means in response to deposition of a bill to be validated into a deviation from the reference level data (*ie* the "correct" response to a "normal" light intensity) provided by the reference level data providing means (*ie* the memory 92 shown in E1 where the "correct" response is stored), and in the sense that the comparison is made between responses normalized with respect to this "correct" response.

5.2 As acknowledged by the respondent, the subject-matter of claim 1 differs therefore from the validator known from E1 in that the reference level for the normalization is the sensor's response to a bill without any pattern or, in the wording of claim 1, in that:

"the reference level data is based on a detection signal produced by said detection means in response to deposition of a reference paper-like piece on which no particular pattern is provided".

6.1 According to the respondent, the fact of obtaining a reference level by operating the validator without any document implies that the detection means operates in saturation, ie in a state in which the sensor has a limited response to small changes in light intensity. Such a reference level would not be suitable for compensating for small variations in the sensitivity of the detecting means due, for instance, to parts or assembling errors.

6.2 In the opinion of the Board, however, it is implicit for a person skilled in the art that a reference level suitable for compensating for variations in the detection means' response due to misalignment and/or aging of some component parts should not be close to the sensor's saturation level. In fact, it is generally known that a sensor's gain for small variations in the input light signal tends towards zero as the sensor approaches saturation.

6.3 The validator shown in Figure 1 of E1 has two pairs of detection means, whereby each pair comprises a light source for scanning a surface of the document and a

corresponding sensor located on the same side for detecting the light reflected from the scanned surface. The fact that E1 teaches to obtain a reference level by operating the validator without any document should not be interpreted as an indication that the reference level is close to the saturation level. On the contrary, a person skilled in the art, knowing that a reliable reference level for detecting means designed to operate in a linear range can only be obtained when the light sensor does not saturate, will assume that the teaching of E1 to generate a reference level without any document has to imply that in the embodiment of Figure 1 the quantity of light reflected by the surface opposite the scanning window and reaching the sensor should not saturate the sensor.

6.4 Starting from the teaching of E1, interpreted in the light of the skilled person's general knowledge, a problem solved by the validator according to claim 1 could be defined as increasing the accuracy in the determination of a reference signal for the normalisation of the standard pattern and of the "data to be examined" in order to improve the comparison between such patterns.

6.5 In the opinion of the Board, the skilled person would easily realise that in E1 the use of the surface of a component part of the validator to generate a reference level might introduce some inaccuracy in the measurement due to possible variations in the characteristics of the reflecting surface.

A removable reflecting surface would be an obvious improvement and avoid possible errors in the determination of the reference level due, for instance,

to dust collecting within the scanning area of the apparatus. As pointed out by the appellant, calibration of optical detectors by means of removable standard surfaces is known in the art (see eg E2). In the opinion of the Board, the most straightforward embodiment of such standard surface would be the surface of a "paper-like piece" which could be inserted into the validator just as a document to be validated.

- 6.6 In the result, the Board considers that it would be obvious to a person skilled in the art, wishing to achieve increased accuracy in the determination of the reference level for the validator known from E1, to use a paper-like object with no pattern as reflecting surface. The Board's view is corroborated by the fact that this improvement would not require any substantial modification of the validator known from E1.

Hence, the subject-matter of claim 1 according to the main request does not involve an inventive step within the meaning of Article 56 EPC.

Auxiliary request

- 7.1 Claim 1 according to the auxiliary request differs from claim 1 of the patent as granted in that it further specifies that:

- (I) the detection means includes a sensor system of light transmission type
- (ii) the standard pattern providing means provides the standard pattern corresponding to the pattern on the normal paper-like piece as a ratio or deviation to the reference level data.

7.2 Feature (ii) actually clarifies that the standard pattern is also normalized with respect to a reference level indicative of the sensor's response to a certain light intensity. According to the teaching of E1, the validation of a document is effected by comparing the detected pattern (*ie* the "data-to-be-examined"), multiplied by the correction factor, with the stored "standard pattern", whereby the correction factor is the ratio of the "normal" reference level to the actually measured reference level. This is equivalent to a comparison between a standard pattern normalized with respect to the **normal** reference level and a measured pattern normalized with respect to the **measured** reference level. Hence, feature (ii) expresses in different terms what is already disclosed in E1.

7.3 As to feature (I), the preferred embodiment of the validator according to E1 (see Figure 1) shows a different disposition of light sources and light sensors. However, it is pointed out in E1 (see page 5 last paragraph to page 6 first paragraph) that detecting means of known validators operate either in the reflective or in the transmissive mode, *ie* they can detect a document's pattern by processing either the light reflected by or the light passing through the document.

In a validator operating in the transmission mode, the question of whether the detector saturates or not when there is no document in the scanning region, *ie* when the reference level is determined, depends essentially on the amount of light passing through the document. In other words, a rather opaque document would require a stronger light source whereas a more transparent document would need a weaker light source. It is

evident that in the first case the sensor would easily saturate if the light travelled without attenuation from the source to the sensor.

The person skilled in the art would easily realize that a validator suitable for less transparent documents, and thus requiring a stronger light source (or a more sensitive sensor), would operate in saturation if the light passing through the scanning window were not attenuated. As pointed out above (see point 6.5), it would be obvious to use a paper-like object as specified in claim 1 in order to ensure that the light intensity reaching the sensor when the reference level was measured did not differ substantially from the light intensity to be detected by the sensor in the normal mode of operation.

- 7.4 In summary, a person skilled in the art, wishing to apply the teaching of E1 to a validator comprising detector means operating in the transmission mode would realise that it might be necessary to attenuate the light reaching the sensor when the validator was operated to generate a reference level and that a paper-like piece with no particular pattern could be used to avoid saturation of the light sensor.

Since the claimed validator results from a straightforward application of the teaching of E1 to a validator comprising detectors of the transmissive type, the subject-matter of claim 1 does not involve an inventive step within the meaning of Article 56 EPC.

8. In summary, the Board finds that none of the respondent's requests is allowable and that, therefore, there is no basis for the maintenance of the patent.

Order

For these reasons it is decided:

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

R. Schumacher

G. Davies